REMARKS

Claims 1-14 are pending, of which claims 5, 6, 13 and 14 have been withdrawn from consideration. Claims 1-4 and 7-12 stand rejected. Claim 1 has been amended. In view of the amendments to the claims and the remarks below, Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

Claims 7 and 8 stand rejected under 35 U.S.C. § 112, first paragraph, for failure to comply with the enablement requirement. Specifically, the Examiner alleges that the "subject matter of the claims was not described in the drawings or specifications that are relevant to the elected embodiment of Figs 1-3." Office Action, p. 2. This rejection is respectfully traversed.

The subject matter of claims 7 and 8 is described in paragraph [0018] of the application. Paragraph [0018] of the application relates to a "first aspect" of the present invention. *See, e.g.*, Application, ¶¶ [0010]-[0021]. The first aspect of the present invention corresponds to elected claim 1. Thus, the subject matter of claims 7 and 8 is described with regard to the elected embodiment. Accordingly, applicants respectfully request that the §112 rejection be withdrawn.

Claims 1-4 and 7-12 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,560,259 to Hwang ("Hwang"). This rejection is respectfully traversed.

Claim 1 recites a laser comprising a substrate that includes a bulk region and a conducting layer. The laser also includes an active region that comprises "a quantum cascade structure provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer." The active region is formed of layers "having a thickness selected such that an energy spacing of sub bands formed by the layers causes the active region to lase at a frequency in the range from 100 GHz to 20 THz." The conducting layer includes first and second contacts "such that said first and second contacts are electrically connected to said active region, said first and second contacts being disposed on opposite sides of said active region, with said active region positioned between said first and second contacts." As explained below, Hwang does not disclose these limitations.

Hwang relates to a quantum cascade laser ("QCL") which operates in the mid-infrared frequency range. Hwang, col. 7, ll. 12-18. Hwang discloses an operational wavelength range of 3 to 13 microns, corresponding to a frequency range of 23 to 99 THz. *See, e.g.*, Hwang, col. 4, ll. 64-65. This frequency range is outside of the scope of the range recited in claim 1. Additionally, the Hwang laser does not include "first and second contacts being disposed [on the conducting layer] on opposite sides of said active region, with said active region positioned between said first and second contacts." The Hwang laser includes two electrical contacts 122, but the active region of the Hwang laser is not positioned between the two electrical contacts. Hwang, fig. 1.

The Hwang laser would need to be physically changed in order to operate in the frequency range recited by claim 1. The Hwang laser is typical of conventional QCLs improved upon by the present invention. The Application states: "Although QCLs were developed which operated in the infra red frequency range, a terahertz QCL proved more difficult since it required thicker layers. Fabricating a device with thicker layers is not a problem per se, however, such devices did not lase since difficulties were encountered in recycling electrons within the device and guiding the photons out of the device." Application, ¶ [0008]. A solution to the problem, as recited in claim 1, is to provide a conductive layer upon which the active region is positioned, the active region being between two contacts that act as a waveguide. In Hwang, the assistance of electrical contacts as a waveguide is not provided, and thus the Hwang QCL is not designed to work at longer wavelengths. Instead, Hwang uses a "lens-like media structure" to enable the Hwang laser to operate at longer wavelengths. The present invention does not rely upon a lens-like media structure. Therefore, the differences between Hwang and claim 1, e.g., the position of the active region in relation to the contacts and the operating range of the recited laser, are significant. Accordingly, Hwang fails to anticipate claim 1. Claim 1 is thus allowable over Hwang.

Claims 2-4 and 7-12 depend from claim 1 and are thus also allowable for at least the same reasons that claim 1 is allowable.

Applicant respectfully requests that the §102(e) rejection over Hwang be withdrawn.

Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hwang in view of U.S. Patent Application Publication No. 2004/0233963 to Hooper et al. ("Hooper"). The rejection is respectfully traversed.

Claims 7 and 8 depend from claim 1. As such, claims 7 and 8 are allowable over Hwang for at least the same reasons explained above that claim 1 is allowable over Hwang. Additionally, Applicants respectfully note that Hooper is not prior art to the present application. Hooper was filed in the U.S. Patent and Trademark Office on March 24, 2004. Hooper claims priority to a British application filed on March 25, 2003. However, the present application was filed as a PCT application on October 10, 2002. Therefore, the filing date of the present application predates the earliest priority date of Hooper. Accordingly, because claims 7 and 8 are allowable over Hwang and because Hooper is not prior art, claims 7 and 8 are allowable over the cited combination. Applicants request that the §103 rejection be withdrawn.

In view of the above amendment, Applicants submit that the present application is in condition for allowance, and such action is earnestly solicited.

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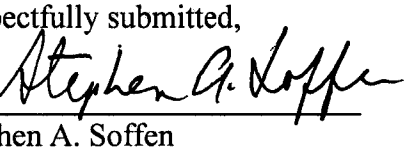
Respectfully submitted,

By 

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